

DEPARTMENT OF AGRICULTURAL ECONOMICS AND EXTENSION

WORKING PAPER

CEREALS TRADE PATTERNS IN THE SADCC REGION

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I. INTRODUCTION

A. The Research Project

In recent years, the nine member states of SADCC have increasingly voiced an interest in expanded intra-regional trade as one strategy towards increased food security within the region. The fact that six of the nine countries are landlocked, transport costs are high, and dependence on trade with external countries (including South Africa) is viewed as precarious, have contributed to a sense of urgency which resulted in the funding of pre-feasibility and feasibility studies for the establishment of a regional food security scheme based on local reserves.

However, levels of intra-regional trade have historically been low. The proportion of intra-SADCC trade in overall trade is only 4-5% (Chr. Michelsen, 1986). For food grains such as maize, much intra-regional trade has been in the form of donor-supported food aid (although percentages of commercial versus aid imports have never been comprehensively quantified).

In an effort to contribute to the knowledge base on SADCC agricultural marketing and trade, the Department of Agricultural Economics and Extension of the University of Zimbabwe, in collaboration with Michigan State University, initiated a research project in mid-1987 to explore constraints to and potentials for expanded trade in the SADCC region¹.

The general objectives of the research project are as follows:

1. To describe current and historical patterns of agricultural trade: within the SADCC region; between SADCC countries and South Africa; and between SADCC countries and the rest of the world, with particular emphasis on food grains, and farm inputs such as fertilizer, seed, and machinery;
2. To determine the extent to which an economic basis for trade exists within the SADCC region, given current prices and transportation costs;
3. To evaluate alternative domestic agricultural and macro-economic policies which have impacts on trade and food security;
4. To identify present constraints to expanded trade in commodities relevant to food security (both intra-regionally and internationally), focussing on transactions costs and risk;
5. To analyze the potential for a number of policies and programs to expand trade in agricultural commodities and inputs, thereby improving food security in the SADCC region.

¹ This research is a component of an on-going food security research program conducted by the University of Zimbabwe and Michigan State University under a Food Security in Africa Cooperative Agreement funded by the United States Agency for International Development, with contributions from the Regional Office for Southern Africa, the Africa Bureau, and the Science and Technology Bureau.

This is the first in a series of working papers to be issued by the research project. It will partially address Objective 1 above. The authors have constructed a database on trade of three staple grains (maize, wheat, and rice) by destination and source of the commodity for the years 1970-1985. The evolution of cereals trade patterns, including the role of food aid and import bill fluctuations will first be discussed in general terms. Each commodity will then be dealt with in greater detail. Finally, the importance of trilateral food aid transactions will be examined. Readers interested in the technical details of the database may read the appendix where data sources and methods employed in constructing trade matrices as well as strengths and limitations of the database are described.

II. AN OVERVIEW OF CEREALS TRADE PATTERNS

There are a number of generalizations that one can make for the three commodities surveyed. Overall regional imports of each commodity have grown substantially from an annual average of 800,000 MT in 1970-75 to an average of nearly 1.9 million MT during the 1981-84 period (Table 1). Most of this growth has occurred during the 1980's as drought, warfare, high population and urbanization growth rates, and (in some cases) agricultural and macro-economic policies have combined to make it increasingly difficult for most SADCC nations to feed themselves.

Table 1 indicates that in real terms, total cereals imports have nearly doubled in value from roughly US\$ 220 million in the early 1970's to over US\$ 426 million in the early 1980's².

Bilateral and multilateral donor organizations have been willing to fill part of this gap in import needs with food aid. The steady growth of food aid as a portion of total imports for all three commodities attests to this. From 1981-84, nearly half of all cereal imports were in the form of food aid (in value terms). This compares to only 13 percent during the 1970-75 period. However, such aid is not always reliable or adequate -- especially during periods of high world prices. In such periods, the SADCC commercial import bill has ballooned.

Production has not kept up with food needs in a number of the SADCC countries (Table 2). Cereals self-sufficiency and self-reliance ratios are

² Throughout the paper, nominal values are converted to real values using the US GDP deflator (unless otherwise indicated). 1982 is the base year, meaning that all real values are stated in constant 1982 dollars.

TABLE 1: Average Annual Quantities and Values of Cereals Imports
by the SADC Countries -- Selected Years

	1970-75	1976-80	1981-84
MAIZE			
Quantity:			
Commercial Imports	227,336	297,541	557,399
Food Aid Imports	47,933	166,720	334,325
Total Imports	275,269	464,261	891,724
Import Bill Value:			
Commercial Imports	47.475	57.270	89.995
Food Aid Imports	10.972	32.533	54.616
Total Imports	58.447	89.803	144.611
Food Aid as Percent of Total Imports (Qty.)	17.4%	35.9%	37.5%
WHEAT			
Quantity:			
Commercial Imports	443,496	351,769	378,036
Food Aid Imports	40,150	174,620	278,100
Total Imports	483,646	526,389	656,136
Import Bill Value:			
Commercial Imports	119.300	85.395	72.633
Food Aid Imports	13.260	41.378	53.062
Total Imports	132.560	126.773	125.695
Food Aid as Percent of Total Imports (Qty.)	8.3%	33.2%	42.4%
RICE			
Quantity:			
Commercial Imports	39,933	150,580	228,407
Food Aid Imports	3,967	45,220	108,300
Total Imports	43,900	195,800	336,707
Import Bill Value:			
Commercial Imports	25.951	65.954	50.890
Food Aid Imports	3.923	27.688	105.360
Total Imports	29.874	93.642	156.250
Food Aid as Percent of Total Imports (Qty.)	9.0%	23.1%	32.2%
TOTAL CEREALS			
Quantity:			
Commercial Imports	710,765	799,890	1,163,842
Food Aid Imports	92,050	386,560	720,725
Total Imports	802,815	1,186,450	1,884,567
Food Aid as Percent of Total Imports (Qty.)	11.5%	32.6%	38.2%
Import Bill Value:			
Commercial Imports	192.726	208.619	213.518
Food Aid Imports	28.155	101.599	213.038
Total Imports	220.881	310.218	426.556
Food Aid as Percent of Total Imports (Value)	12.7%	32.8%	49.9%

NOTES: Quantities are in metric tons;
Import bill values are in millions of constant 1982 US dollars.

Source: UZ/MSU Cereals Trade Database; FAO Trade Tapes;
FAO, "Food Aid In Figures".

TABLE 2: Cereals Self-Sufficiency and Self-Reliance Ratios
in the SADCC Countries
(Percentages)

	1970-1972 (Average)	1979-1981 (Average)	1985/86	1986/87*
ANGOLA				
Self-Sufficiency Ratio	84.9	52.2	61.0	50.2
Self-Reliance Ratio	100.0	97.8	90.1	64.9
BOTSWANA				
Self-Sufficiency Ratio	78.9	22.4	9.5	11.4
Self-Reliance Ratio	94.5	91.7	83.8	73.7
LESOTHO				
Self-Sufficiency Ratio	80.9	54.8	46.5	44.3
Self-Reliance Ratio	91.3	89.8	84.2	88.1
MALAWI				
Self-Sufficiency Ratio	95.7	96.5	98.3	85.7
Self-Reliance Ratio	100.0	99.4	100.0	88.9
MOZAMBIQUE				
Self-Sufficiency Ratio	85.8	53.8	53.6	31.3
Self-Reliance Ratio	100.0	83.6	57.2	31.3
SWAZILAND				
Self-Sufficiency Ratio	NA	62.3	64.1	63.5
Self-Reliance Ratio	NA	99.3	100.0	98.7
TANZANIA				
Self-Sufficiency Ratio	93.1	91.4	97.9	97.3
Self-Reliance Ratio	99.5	95.5	98.6	98.7
ZAMBIA				
Self-Sufficiency Ratio	82.6	74.4	86.9	87.5
Self-Reliance Ratio	100.0	92.7	92.3	91.3
ZIMBABWE				
Self-Sufficiency Ratio	97.0	97.5	96.3	95.3
Self-Reliance Ratio	100.0	99.8	97.9	98.9
TOTAL SADCC				
Self-Sufficiency Ratio	91.2	82.9	88.3	82.5
Self-Reliance Ratio	99.6	95.6	94.0	88.2

Notes: All figures have been calculated on a quantity (not value) basis.

*Projected

Sources: FAO "Production Tapes" (for 1970-72 production);
FAO "Food Outlook" February 1987 (for 1985/86 production projections);
FAO "Food Supply Situation and Crop Prospects in Sub-Saharan Africa", December 1987 (for 1986/87 production);
USDA/FAS "Production, Supply, and Distribution Tapes" (for carryover stock levels);
UZ/MSU SADCC Cereals Trade Database, FAO Trade Tapes, and FAO, "Food Aid in Figures" (for commercial and food aid imports).

calculated for all of the SADCC countries in four time periods ³. The self-sufficiency ratio measures the extent to which a country met its food needs through domestic production during the period covered. The self-reliance ratio measures the extent to which a country met its food needs through a combination of domestic production and commercial imports. For all of SADCC, food self-sufficiency has fallen since the early 1970's from 91 percent in 1970-72 to 82.5 percent for 1986/87, indicating that production has not kept pace with demand. However for somewhat better years (such as 1985/86), self-sufficiency approaches but does not quite attain early 1970's levels.

Concerning individual countries, four categories of performance are discernible: countries where both self-sufficiency and self-reliance have fallen substantially; countries where self-sufficiency has fallen while the ability to finance commercial imports has not deteriorated; countries where deterioration in the 1970's has partially been reversed in the 1980's; and countries which began the 1970's at high levels of self-sufficiency and self-reliance and have maintained these levels in most years.

In war torn countries such as Mozambique and Angola, self-sufficiency and self-reliance ratios have fallen precipitously as both production and the ability to finance commercial imports with foreign exchange earnings have been severely disrupted.

The BLS countries ⁴ have seen their self-sufficiency ratios shrink, implying falling per capita food production. However the ability to finance imports has not declined significantly. For Lesotho and Swaziland, this may be principally due to the substantial earnings of their citizens in South African mines. Much of these earnings are repatriated, enabling Lesotho and Swaziland to import food staples from South Africa. For Botswana, foreign exchange surpluses derived from diamond exports have increased their ability to finance imports. However this is not really reflected in the Table 2 figures as self-reliance appears to have eroded radically. Although the country easily has the ability to pay for all its food import needs, the government's food aid distribution system has a reputation for being well-

$$^3 \text{ Self-Sufficiency Ratio} = 1 - \frac{\text{TOTIM}}{\text{TOTPROD} + \text{LPSTOCK}}$$

$$\text{Self-Reliance Ratio} = 1 - \frac{\text{FOODAIDIM}}{\text{TOTPROD} + \text{LPSTOCK} + \text{COMMIM} + \text{COMMSTOCK}}$$

where: TOTIM=Total Imports
 TOTPROD = Local Production
 LPSTOCK = Locally-Produced Carryover Stocks
 FOODAIDIM = Food Aid Imports
 COMMIM = Commercial Imports
 COMMSTOCK = Commercial Imports Held as Carryover Stocks

⁴ Botswana, Lesotho, and Swaziland.

run. This contributes to making Botswana a favorite recipient for food aid donations.

Tanzania and Zambia saw a significant decline in the extent to which they met local needs through own-production and self-financing during the latter half of the 1970's and early 1980's. This was at least partially due to a systematic policy bias against the agricultural sector. This bias has been reversed somewhat in recent years as these countries' governments have adopted reform measures such as devaluation and pricing policies which appear to have encouraged agricultural production. This is reflected in higher self-sufficiency ratios for 1985/86 and 1987/88. Tanzania has also enjoyed good harvests in these years, also leading to higher self-reliance ratios as food aid dependency has lessened somewhat. For Zambia, harvests have not been as good, foreign exchange continues to be in short supply due to depressed copper prices, and progress has been slow in diversifying exports. As a result, self-reliance has not really improved appreciably.

Finally Zimbabwe and Malawi started with relatively high ratios in the early 1970's and have largely maintained them at high levels -- the only exception being Malawi this year. Poor 1986/87 harvests and an influx of Mozambiquean refugees into Malawi have resulted in food aid imports being much larger than has historically been the case. Similarly, poor harvests are responsible for a slight decline in the Zimbabwean ratios for 1986/87.

III. TRADE PATTERNS FOR INDIVIDUAL CEREALS

The extent of intra-SADCC trade in total SADCC trade varies greatly between the three cereals included in the database. Whereas a number of countries have had exportable surpluses of maize during some of the years covered (Zimbabwe, Zambia, Tanzania, Malawi, and Angola), only one country (Malawi) has consistently exported some rice, and no country has ever exported appreciable quantities of wheat.

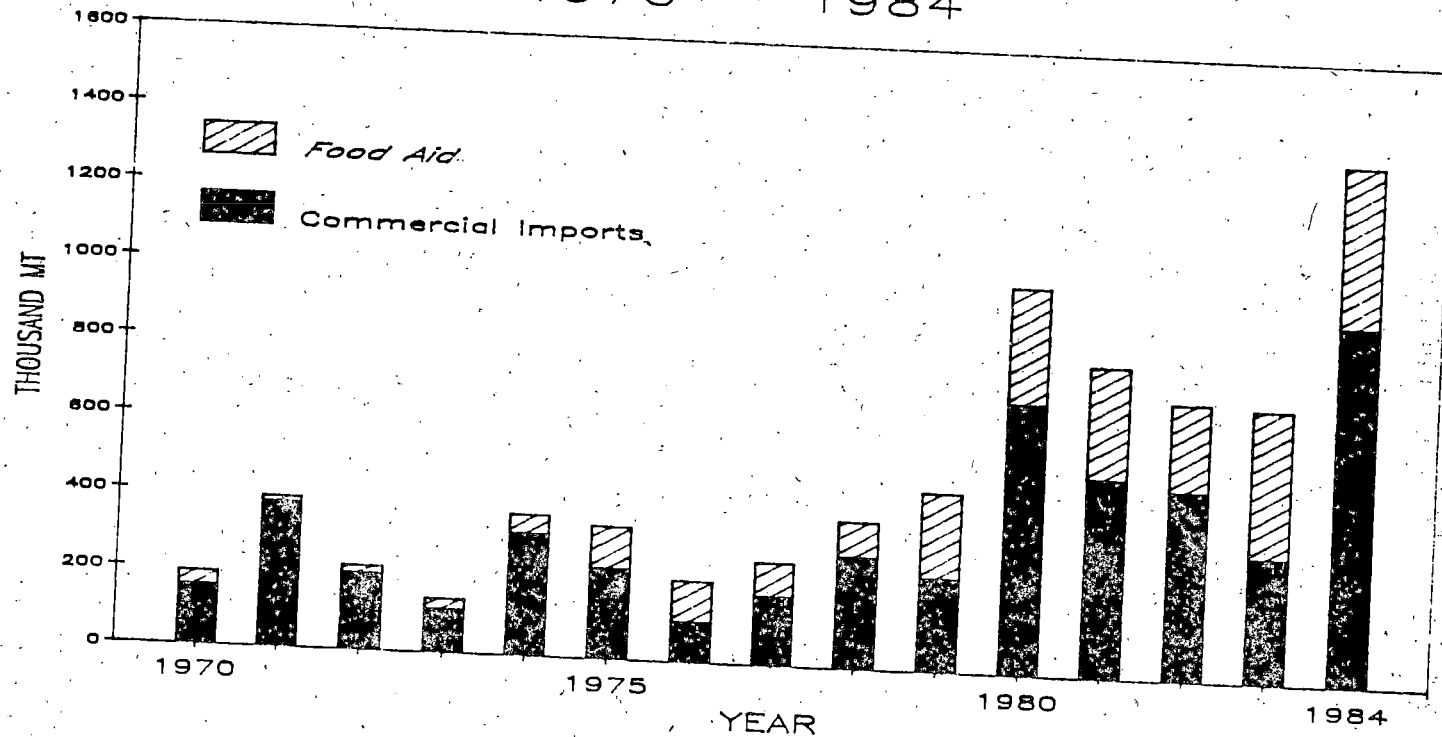
In this section, the following questions will be discussed for each of the commodities:

- Which of the SADCC nations are major importers and exporters?
- What countries are major exporters to the SADCC nations?
- What is the proportion of intra-regional trade in total trade?
- What has been the role of food aid in facilitating cereals trade and how has the import bill evolved?

A. Trade in Maize

Maize imports have grown at a 6 percent average annual rate since 1970 (see Figure 1). Both commercial and food aid imports have grown steadily during this period. Food aid imports grew at a 7.3 percent annual rate. Up until 1978, volumes were relatively low, averaging only 65,700 MT annually for all of SADCC. However this picked up substantially in the late 1970's

Figure 1: SADCC Maize Import Quantities
1970 — 1984



Source: FAO and WFP

and 1980's, averaging 311,300 MT from 1979-1984. Commercial imports have also grown at a strong 5.6 percent rate. As with food aid, growth accelerated most rapidly during the post-1978 period.

Mozambique, Tanzania, and Zambia have been most responsible for the bulk of this growth in imports (Figure 2). However in the drought years of 1980 and 1984, other countries such as Zimbabwe, Angola, and the BLS countries imported large quantities of maize.

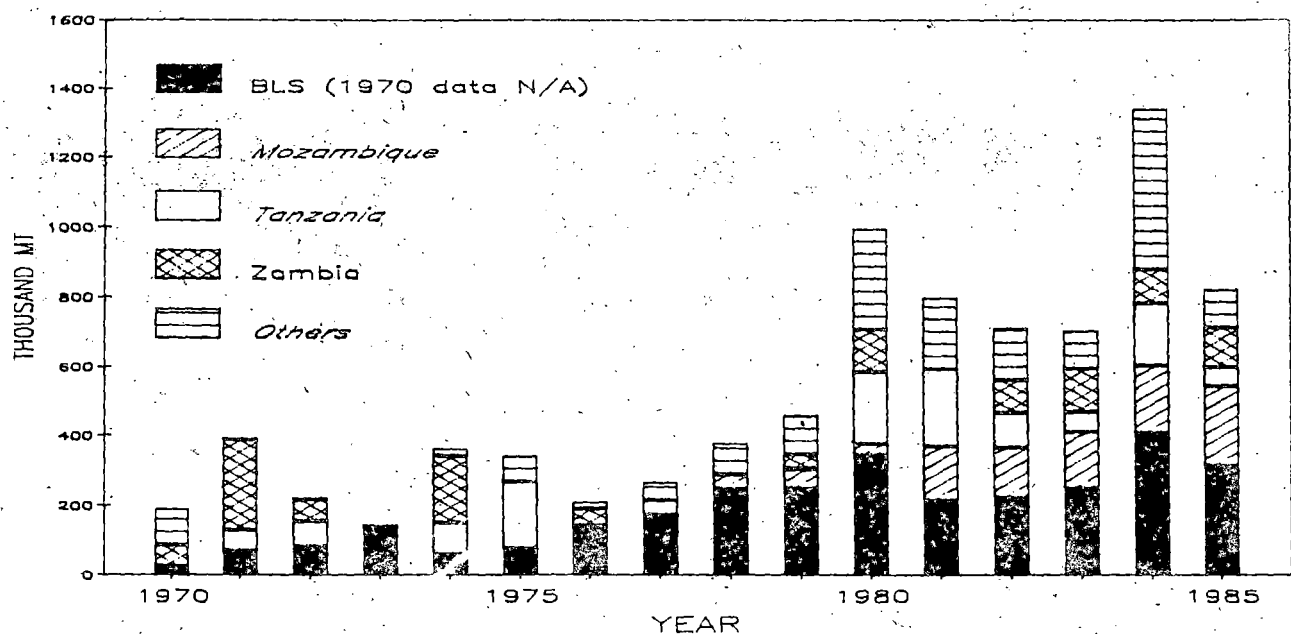
Growth rates in the maize import bill closely parallel those of import quantities (Figure 3). The real import bill grew from a 1970-72 average of \$US 43.6 million to a 1982-84 average of \$US 464.7 million -- an annual rate of 5.9 percent ⁵. The commercial bill grew at a 5.4 percent rate while the food aid bill grew at a higher 7.1 percent annual rate. While the food aid bill has grown at a steady rate, the commercial bill has tended to be very erratic, reflecting both fluctuating world prices (especially in the early 1970's) and high import requirements during drought years such as 1980 and 1984 ⁶.

⁵ Dollar figures need to be approached with caution for a number of reasons. First they are understated here because inland transportation costs have not been factored in due to the difficulty of doing calculations for nine countries. Only c+f rates from US Gulf ports to Durban have been used. Secondly, average annual prices of No.2 US yellow maize have been used as opposed to a white maize price series (the authors were unable to find a complete white maize price series for the period covered). Although the exact relationship between white and yellow maize prices is difficult to pin down, the yellow maize price usually serves as a floor for the white maize price. In most years, white maize earns a slight premium over yellow maize in world markets. However in periods of white maize shortage, the premium can be quite high. In 1980, when world white maize harvests were poor, the premiums for US and South African white maize over US and South African yellow maize were 48 and 90 percent respectively (FAO, 1984a). Therefore, import bill figures are again understated, but the exact amount can not be quantified. In addition, it is not possible to determine the proportion of yellow versus white maize imports.

⁶ To the extent that SADCC exchange rates, inland transportation costs, and domestic inflation in SADCC countries fluctuated in ways that were not counter-cyclical to US dollar price changes, variability in the maize import bill in local currency terms is even greater. The coefficient of variation (a measure of variability around the mean whose value is between 0 and 1 and therefore scale-neutral) for the real US dollar yellow maize price c+f Durban was 0.27 over the 1970-85 period. Using a Zimbabwean example, when the coefficient of variation is calculated c+f Harare in local currency terms, it more than doubles to 0.62.

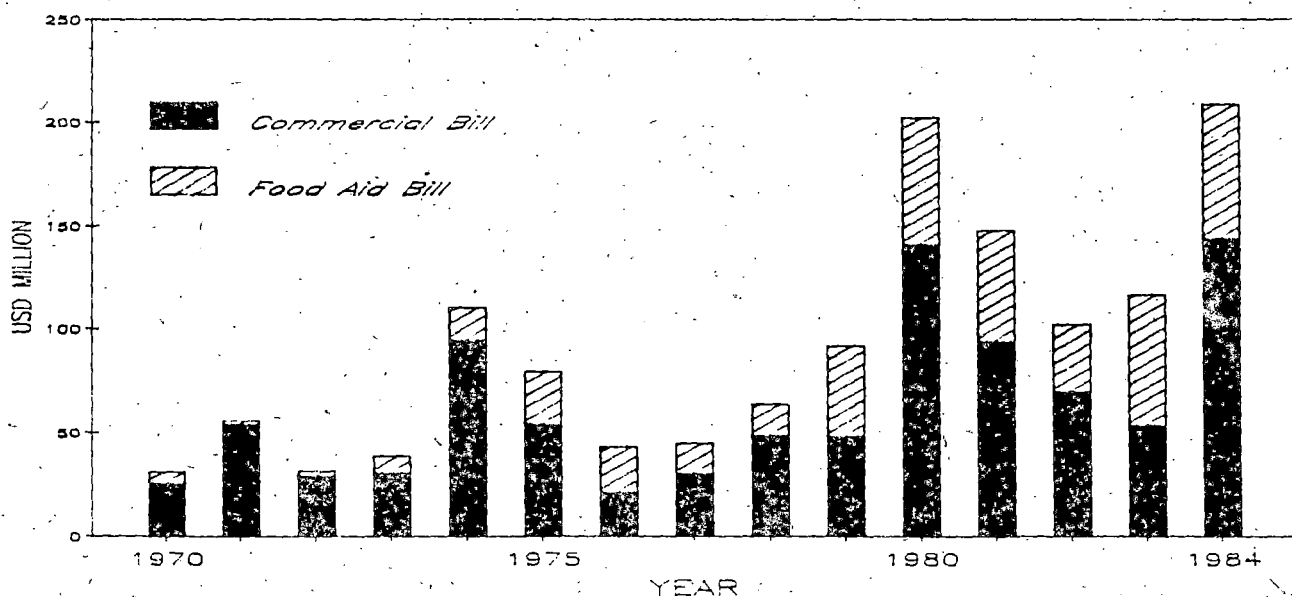
There is also evidence that white maize prices are more volatile than yellow maize prices due to the relative thinness of the world white maize market. The coefficient of variation for nominal South African white maize prices free alongside elevator (fae) from 1970-82 was 0.36 while it was 0.30 for US yellow maize c+f Durban over the same period.

Figure 2: SADCC Maize Imports by Country
1970 - 1985



Source: UZ/MSU SADCC Cereals Trade Database

Figure 3: SADCC Maize Import Bill
1970 - 1984
(In Real US Dollars)



Source: FAO, WFP, World Bank

Maize is the only cereal which has been exported in one year or another by several SADCC countries in significant quantities (over 10,000 MT). Of the countries identified in Table 3, only Zimbabwe and Malawi have consistently exported maize to other SADCC countries. Except for the civil war years in the latter half of the 1970's and the drought year of 1984, Zimbabwe has dominated intra-regional trade in most years. In addition, only Zimbabwe and Malawi have remained exporters in the 1980's although export availability has fluctuated widely. Those countries which have most consistently imported from other SADCC countries are Mozambique, Tanzania, Zambia, and Malawi (Table 4). Due to the severe disruption of agricultural activity resulting from civil strife, Mozambique has dramatically increased maize imports from other SADCC nations during the 1980's. Zambia and Tanzania went from positions of occasional surplus in the 1970's to a state of consistent deficit in the first half of the 1980's⁷. The BLS countries have traditionally imported almost exclusively from South Africa. Malawi is the country which has switched most often between net surplus and deficit situations. This seems to happen in a cyclical fashion every three to four years⁸.

Intra-SADCC trade as a proportion of overall trade of goods has been estimated at roughly 4-5 percent (Chr. Michelsen, 1986). However Table 5 illustrates that the proportion for intra-SADCC maize trade is considerably higher than this in most years. Because of the considerable gaps associated with BLS data (due to South African refusal to issue disaggregated figures on trade with these countries), intra-SADCC trade as a percentage of total maize imports is calculated twice: first with the available destination and source data, and; secondly, with South African aggregate export figures to the BLS nations and Namibia added to the total maize import figures. With the exception of four years, intra-SADCC trade as a proportion of total maize trade is above 10 percent. Percentages are very high for the years 1982, 1983, and 1985 due to large Zimbabwean surpluses. However, in eleven of the fifteen years covered, SADCC imports from South Africa exceeded imports from other countries⁹. Moreover, intra-SADCC maize trade grew at only a 1.5 percent annual rate during 1970-1985. At the same time dependence on South Africa increased, growing at an 11.8% rate. Most of this was due to increased imports by the BLS countries.

⁷ However for 1987/88, Tanzania is expected to have an exportable surplus of coarse grains on the order of 115,000 MT (FAO, "Food Supply Situation and Crop Prospects", December, 1987).

⁸ In 1986, Malawi achieved a net surplus for the fourth straight year. However 1986/87 was not a good year and the FAO estimates coarse grain import requirements for 1987/88 at 175,000 MT.

⁹ Maize imports from SADCC as a percentage of total SADCC maize imports (Column F of Table 5) may be slightly higher due to the inclusion of Namibian imports in total SADCC imports (Column E). By the same token, the portion of SADCC imports which originate in South Africa may also be slightly overstated (Column G).

TABLE 3: Intra-SADCC Maize Exports 1970-1985
(Metric Tons)

Year	Angola	Malawi	Tanzania	Zambia	Zimbabwe	TOTAL
1970	17,905	0	20,000	1	87,200	125,106
1971	10,176	4,652	26,344	100	92,492	133,764
1972	0	12,733	0	0	63,327	76,060
1973	0	1,172	0	0	86	1,258
1974	0	19,660	0	69,133	258	89,051
1975	0	15,962	0	0	20,549	36,511
1976	0	0	0	8,809	18,566	27,375
1977	0	0	0	22,139	0	22,139
1978	0	0	37,120	21,903	0	59,023
1979	0	13,350	0	14,400	5,600	33,350
1980	0	0	17	13	0	30
1981	0	0	0	0	107,184	107,184
1982	0	49	0	0	303,585	303,634
1983	0	76,342	0	0	220,417	296,759
1984	0	152,270	0	0	0	152,270
1985	0	57,722	0	0	154,317	212,039

Source: UZ/MSU SADCC Cereals Trade Database

TABLE 4: Intra-SADCC Maize Imports 1970-1985
(Metric Tons)

Year	Angola	Botswana	Lesotho	Malawi	Mozambique	Swaziland	Tanzania	Zambia	Zimbabwe	TOTAL
1970	0	0	0	87,200	7,705	0	0	30,200	0	125,105
1971	0	0	0	208	0	0	0	133,556	0	133,764
1972	0	0	0	117	0	0	12,733	63,210	0	76,060
1973	0	0	0	86	0	0	0	1,149	23	1,258
1974	0	0	0	258	0	0	88,793	0	0	89,051
1975	0	0	0	20,549	0	0	15,962	0	0	36,511
1976	302	0	0	18,566	8,507	0	0	0	0	27,375
1977	22,108	0	0	0	0	0	31	0	0	22,139
1978	21,903	0	0	5,600	37,120	0	0	0	0	64,623
1979	0	0	0	0	14,000	0	0	13,750	0	27,750
1980	0	0	0	0	17	0	0	0	13	30
1981	9,201	0	0	56,944	31,350	0	9,689	0	0	107,184
1982	32,016	14,400	0	942	86,662	12,700	61,459	95,700	0	303,879
1983	2,691	11,900	5,774	44	100,620	3,777	45,983	125,969	1	296,759
1984	0	0	0	0	5,000	0	0	97,270	50,000	152,270
1985	0	8,100	688	0	90,573	0	75	112,663	0	212,099

Source: UZ/MSU SADCC Cereals Trade Database

TABLE 5: Intra-SADCC Maize Trade As A Percentage
of Total Maize Trade 1970-1985
(Quantity Figures in Metric Tons)

Year	SADCC Imports (A)	Total Imports (B)	(A) as % of (B) (C)	RSA Exports to BLS+N (D)	Total (B+D) (E)	(A) as % of (E) (F)	(D) as % of (E) (G)
1970	125,105	192,171	65.1%	NA	NA	NA	NA
1971	133,764	320,511	41.7%	70,000	390,511	34.3%	17.9%
1972	76,060	136,237	55.8%	83,000	219,237	34.7%	37.9%
1973	1,258	1,973	63.8%	139,000	140,973	0.9%	98.6%
1974	89,051	305,492	29.2%	60,000	365,492	24.4%	16.4%
1975	36,511	270,232	13.5%	73,000	343,232	10.6%	21.3%
1976	27,375	80,616	34.0%	131,000	211,616	12.9%	61.9%
1977	22,139	96,869	22.9%	171,000	267,869	8.3%	63.8%
1978	64,623	133,052	48.6%	248,000	381,052	17.0%	65.1%
1979	27,750	211,755	13.1%	250,000	461,755	6.0%	54.1%
1980	30	652,016	0.0%	347,000	999,016	0.0%	34.7%
1981	107,184	588,942	18.2%	214,000	802,942	13.3%	26.7%
1982	303,879	493,376	61.6%	222,000	715,376	42.5%	31.0%
1983	296,759	457,426	64.9%	248,000	705,426	42.1%	35.2%
1984	152,270	935,150	16.3%	408,000	1,343,150	11.3%	30.4%
1985	212,099	825,291	25.7%	447,000	825,291*	25.7%	54.2%*

Notes:

- (A) Represents total recorded intra-SADCC trade in maize;
 (B) Represents total recorded SADCC trade in maize, regardless
 of source of imports;
 (D) South African Exports to the BLS states and Namibia. These
 figures are recorded on an April/March basis. Figures are here
 entered in the first of the split years.

* BLS figures available for 1985.

Source: UZ/MSU SADCC Cereals Trade Database for column (A) and
 (B) figures;
 Lipton (1986) for column (D) figures.

The leading suppliers of maize to SADCC include South Africa, the USA, and Zimbabwe (see Figure 4). While South Africa, the US, and Zimbabwe were more or less the only countries to export significant quantities of maize to SADCC in the 1970's, their market shares have eroded somewhat in the 1980's as a number of other countries have entered the Southern African market. Among these are Thailand, Argentina, Malawi, Kenya, and some of the EC countries (such as France). In 1984, a few of these countries dominated the maize trade. Thailand (294,000 MT), Argentina (237,000 MT), and Malawi (152,000 MT) captured 51 percent of the market in that year.

South Africa still strongly dominates exports to the BLS countries. Leading US customers in the 1970's were Zambia and Tanzania. In the 1980's, most US exports have gone to Mozambique in the form of food aid. Except for 1984 when several countries received imports, all Argentinean SADCC maize exports have gone to Angola¹⁰. Angola in turn, relies almost exclusively on Argentina for its maize imports. The cutting of the Benguela rail line makes it difficult to conceive of there being much potential for increased SADCC exports to Angola in the near future.

EC, Kenyan, and Thai exports have each been distributed among several SADCC countries. Additional minor maize suppliers in the 1980's include Canada and Yugoslavia.

B. Trade in Wheat

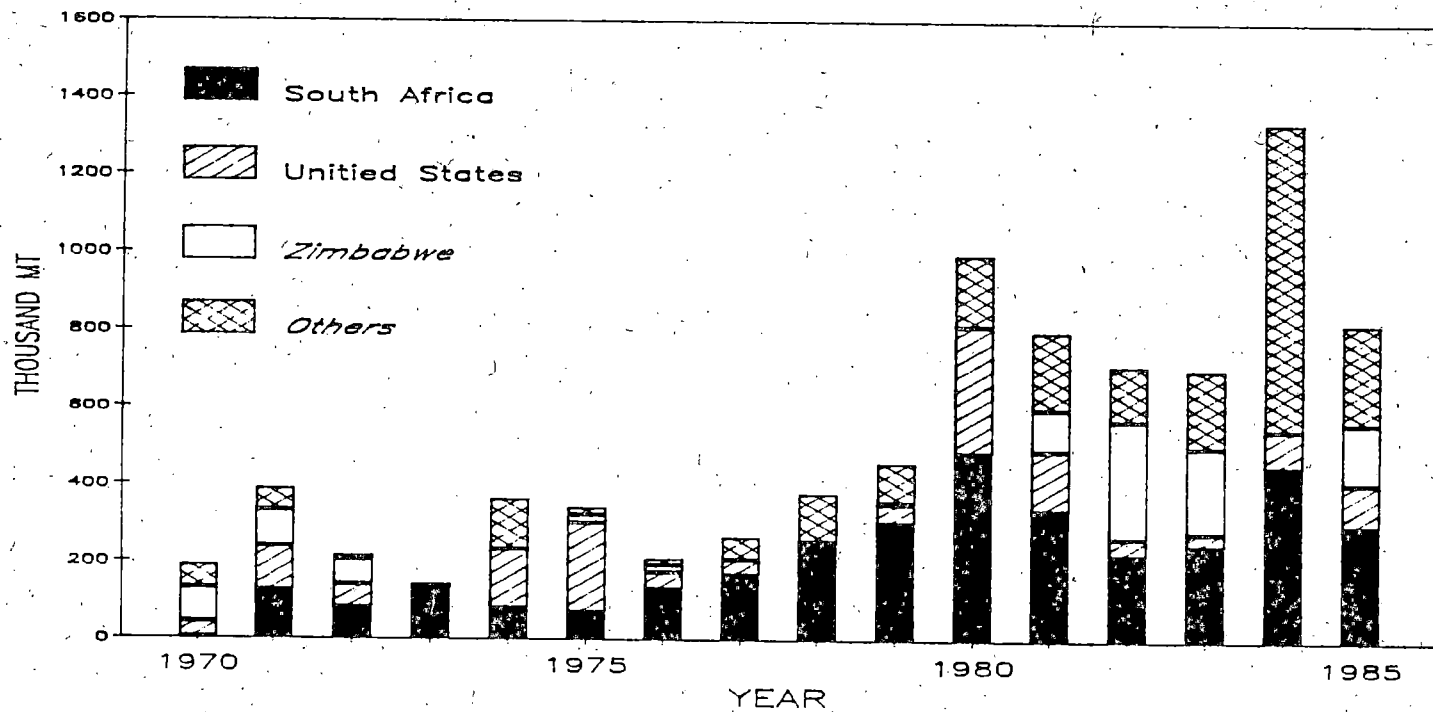
Because none of the SADCC countries have achieved self-sufficiency in wheat production, intra-regional trade is virtually non-existent.

A number of countries have consistently exported fairly substantial quantities of wheat to the SADCC countries since the early 1970's (Figure 5). Australia was by far the leading exporter in the early 1970's. The US and EC nations (most notably France), Canada, and South Africa also exported fairly large quantities to SADCC in the 1970's¹¹. In the 1980's, France and other EC countries have considerably increased their market share, largely at the expense of Australia. Overall wheat imports grew at a 2 percent annual rate from 1970-1984 (see Figure 6). While growth in commercial imports has remained virtually unchanged, the SADCC nations have been quite successful at getting donor countries to give them food aid. Food aid imports have grown from an annual average of only 5,500 MT in 1970-72 to 275,500 MT in 1982-84. This represents a food aid dependency growth rate of roughly 12.5 percent per year over this period.

¹⁰ In 1983 and 1984, the US and Argentina also supplied very large quantities of yellow maize to South Africa. Over 2.4 million MT were supplied by the US in 1984, while Argentina exported more than 650,000 MT in 1983 to South Africa.

¹¹ South Africa's exports were probably considerably higher than the figures in Figure 5 due to the fact that BLS data are not available.

Figure 4: Major Maize Exporters to SADCC
1970 — 1985



Source: FAO and WFP

Figure 5: Major Wheat Exporters to SADCC
1970 — 1985

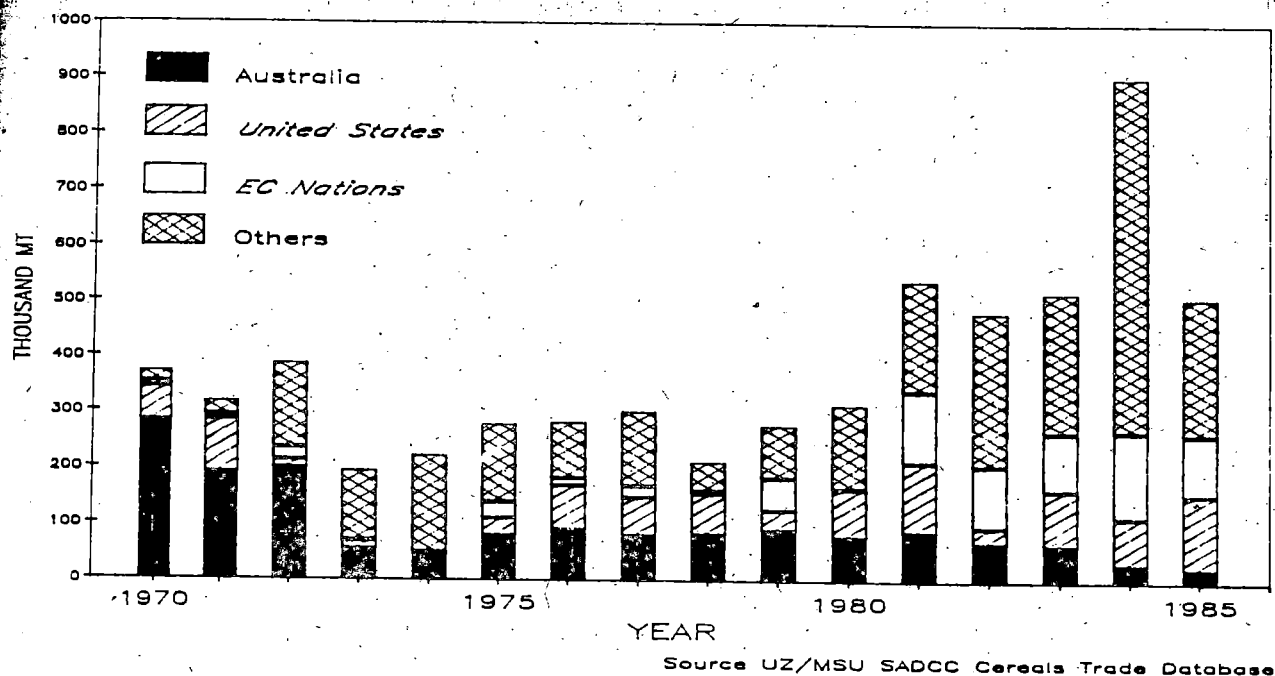
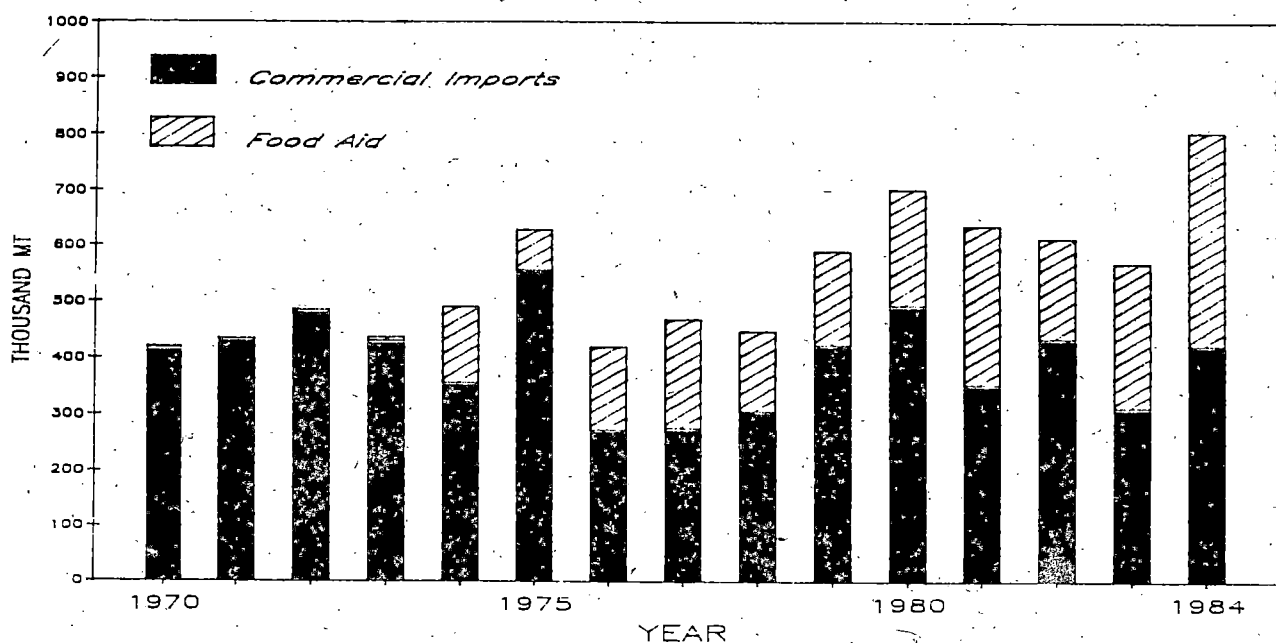


Figure 6: SADCC Wheat Import Quantities
1970 — 1984



While commercial import quantities have not varied too greatly, the commercial import bill has fluctuated widely (see Figure 7). The commercial import bill swelled substantially in times of international shortages such as the 1973-75 and 1979-80 periods. Although donors appear to be willing to bear some of the burden of the import bill during such periods, there is no question that SADCC national treasuries bear the brunt of these price swings.

C. Trade in Rice

Of the nine SADCC countries, only Malawi has consistently exported rice. However quantities are rather small -- usually less than 10,000 MT. Angola and Tanzania have also exported small quantities of rice on occasion -- in most cases less than 1,000 MT for a given year. Zimbabwe and Zambia are the principal importers of Malawian rice¹². Mozambique has also occasionally imported small quantities.

As with the other two commodities, SADCC imports of rice have grown significantly over the years surveyed (see Figure 8). From a 1970-72 annual average of 19,700 MT, imports grew at a 7.7 percent annual rate to over 250,000 MT in the 1982-84 period. Food aid imports grew at a 9.1 percent rate from 1974-84. From 1970-74, no food aid was received by the SADCC countries in the form of rice. The 1982-84 average was 113,500 MT.

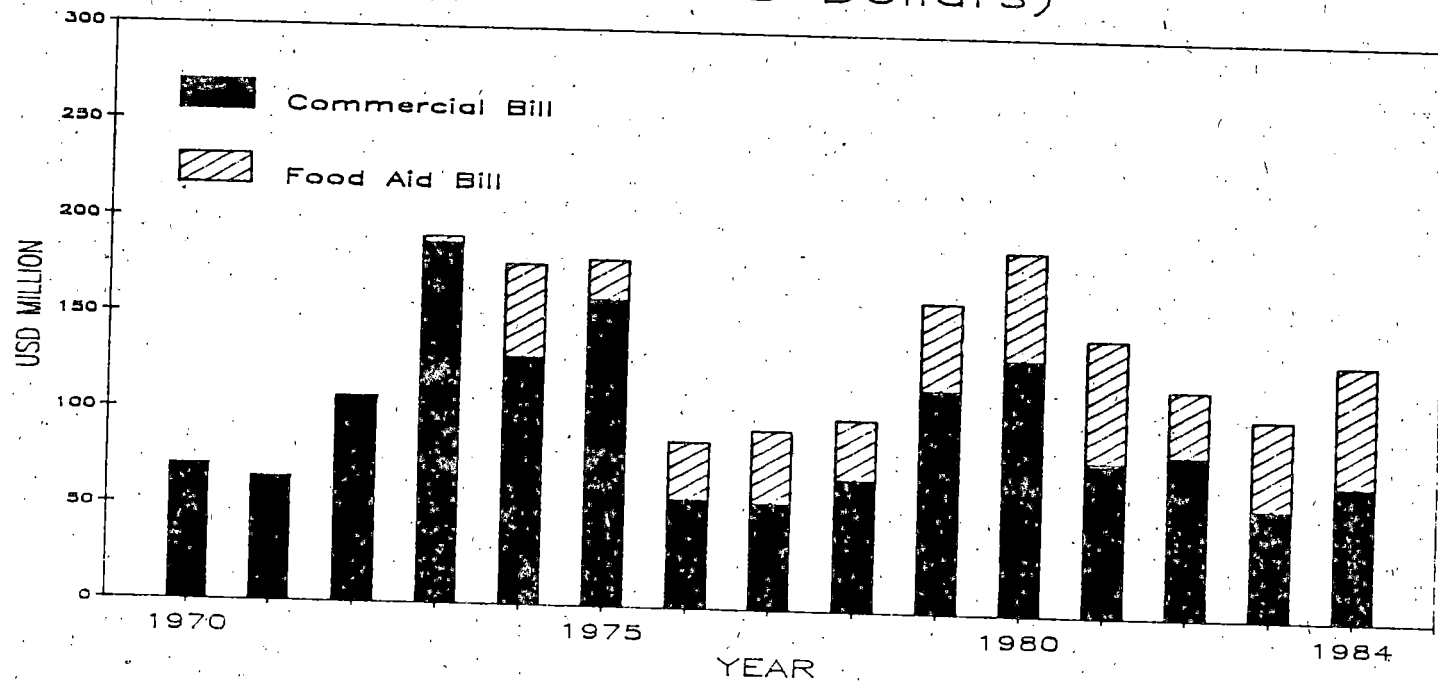
During the 1970's, rice exports to the SADCC countries were dominated by the US (Figure 9). However total quantities imported during the 1970's were small in comparison with maize and wheat import quantities. From 1980 to 1985, rice imports by SADCC countries grew by more than 600 percent as Thailand, a number of other Asian countries (Japan, Pakistan, China, and Burma), and the EC expanded exports. Tanzania, Mozambique, and Angola were primarily responsible for this huge rise in imports. 1970-85 annual import growth rates were 4.8, 5.6, and 7.2 percent, respectively (see Figure 10). As with wheat imports, this was probably due to a fall in world prices and more aggressive marketing by a number of countries which had not previously traded substantially with the SADCC countries.

The import bill has not grown as rapidly as have quantities imported (see Figure 11). The commercial bill grew at a 4.7 percent rate from 1970-84 while the value of food aid grew by a slightly higher 5.3 percent rate for 1974-84¹³. While import bill growth rates for rice are comparable to those

¹² South Africa also imported Malawian rice during the 1970's. Quantities were mostly in the 1,000-3,000 MT range.

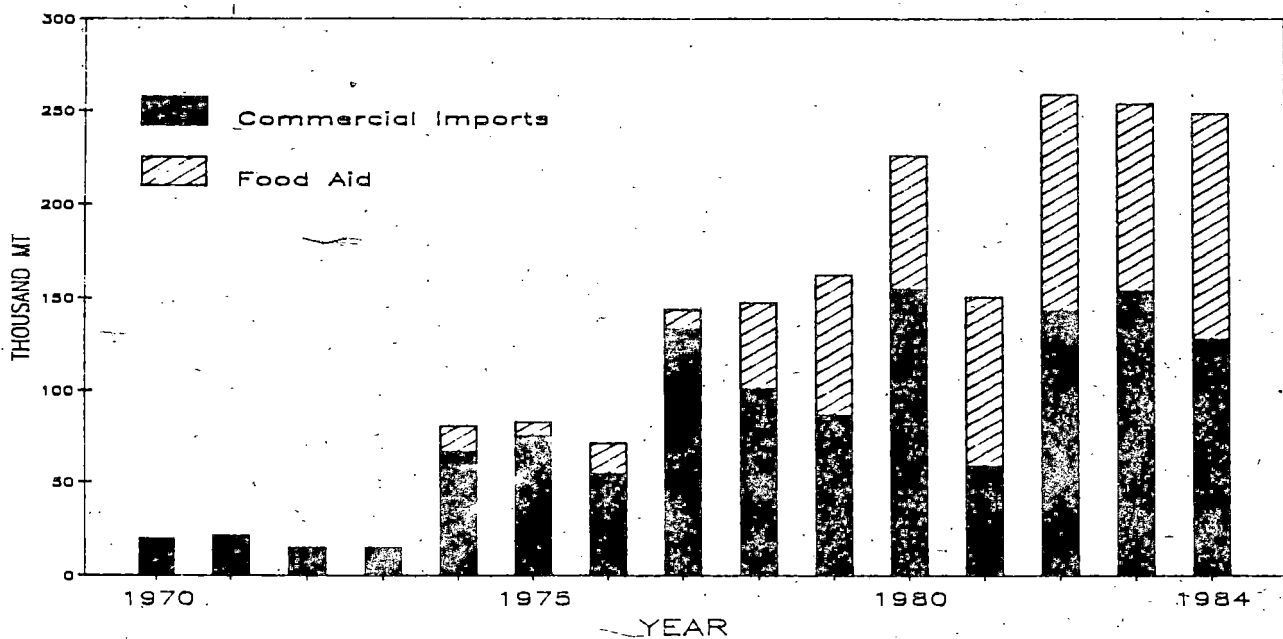
¹³ Import bill growth rates may be overstated because the price series used for the entire period is that of Texas Medium Grain No.2 milled c+f Durban. This is reasonable for the 1970's when the US was the leading rice exporter to SADCC. However in the 1980's, Thailand has replaced the US as the leading exporter, making Thai 5 Percent Milled Broken a more representative price series. Thai fob prices have averaged 20 percent lower than the US fob price during the 1980's. The Thai price was not used here

Figure 7: SADCC Wheat Import Bill
1970 - 1984
(In Real US Dollars)



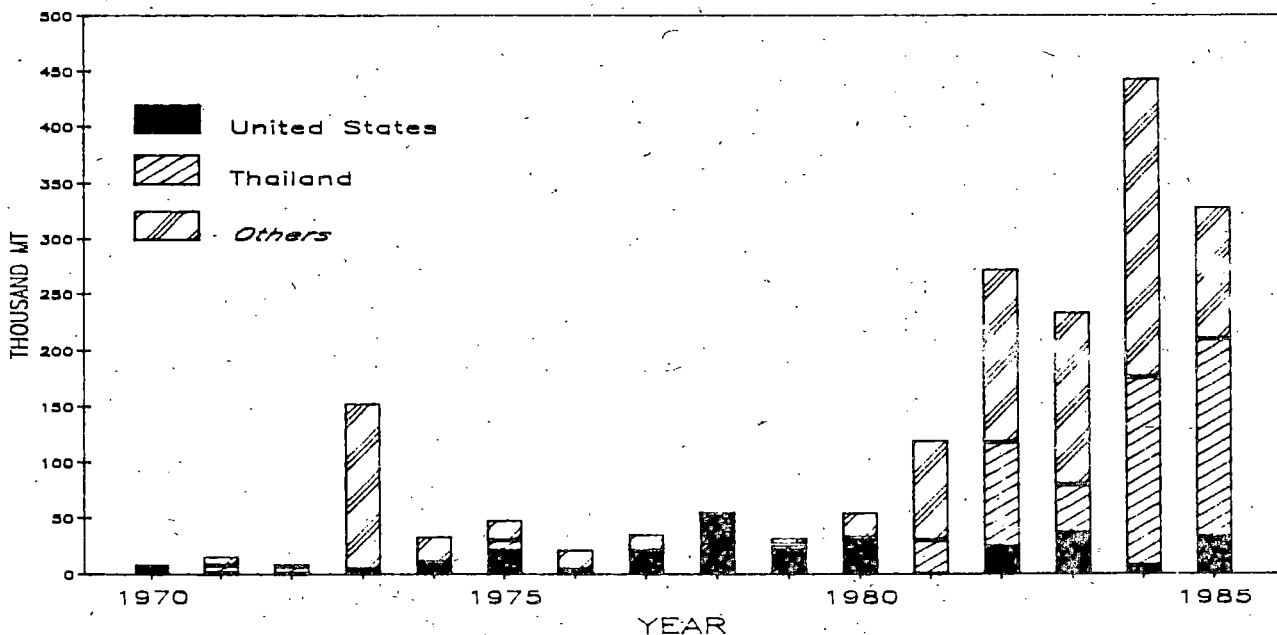
Source: FAO, WFP, World Bank

Figure 8: SADCC Rice Imports
1970 - 1984



Source: FAO and WFP

Figure 9: Major Rice Exporters to SADCC
1970 - 1985



Source: UZ/MSU SADCC Cereals Trade Database

for wheat and maize, the bill is somewhat lower in absolute terms, averaging US\$ 99.4 million for 1982-84 in 1982 dollars (as opposed to US\$ 154.9 million for maize and US\$ 119.3 million for wheat). Again, this may be overstated by as much as 20 percent due to lower Thai prices.

D. The Role of Trilateral Food Aid Transactions in SADCC Trade

During the 1980's, trilateral food aid transactions have taken on increasing importance in intra-SADCC trade. While such transactions do not constitute a large proportion of total donor food aid around the world ¹⁴, they do form a significant portion of intra-SADCC grain movements at present.

Table 6 summarizes SADCC trilaterals in coarse grains ¹⁵ for 1985/86. Zambia (45,714 MT) and Mozambique (37,150 MT) were the leading recipients in that year while Zimbabwe (54,088 MT) and Malawi (48,100 MT) were the leading suppliers. The total quantity of trilateral movements represented 48 percent of total intra-SADCC maize trade and 12.4 percent of total 1985 SADCC maize imports. For the two suppliers, Zimbabwe and Malawi, donors financed respectively approximately one third and over 80 percent of their exports to other SADCC countries.

As a percentage of total cereals food aid imports, figures range from a high of 50 percent for Zambia to as little as 2 percent for Angola. When total cereals imports are considered, the importance of trilaterals in the overall food import picture is further reduced.

For at least one of the leading recipients, maize imports financed as trilateral food aid have become quite important in recent years. The figures in Table 7 indicate that trilaterals have been an important element in Zambian maize imports from 1983-86, constituting more than two thirds of total maize imports in three of the four years. In all four years, trilaterals made up over 90 percent of total food aid imports of maize, and in two of these years maize aid was only received through trilateral programs.

In addition, one must not overlook the increasing importance of trilaterals to countries like Zimbabwe and Malawi which benefit in two ways. First, trilaterals help to ease the storage cost burden resulting from large

because a transportation cost series could not be obtained for Bangkok to an East or Southern African port.

¹⁴ In 1986, the year in which trilaterals reached their highest levels, they accounted for 90,000 MT of food aid, or only 8-9 percent of total food aid (WFP, 1987). For the US, which is the world's leading food aid donor in absolute terms, trilateral transactions made up only 0.15 percent of total PL 480 Title II emergency relief aid for 1983-86 (Morton et al., 1987).

¹⁵ Close to 100 percent of this (if not all) is white maize.

TABLE 6: SADCC Trilateral Transactions in Coarse Grains 1985/86

Recipient	Country of Purchase	Donor	Quantity (MT)	As % of Total Food Aid	As % of Total Imports
Angola	Zimbabwe	Australia	504		
	Malawi	ICRC*	300		
	Zimbabwe	ICRC	430		
Sub-Total			1,234	2.4%	0.6%
Botswana	Zimbabwe	F.R. Germany	1,590		
	Malawi	Norway	6,500		
Sub-Total			8,090	24.5%	4.1%
Mozambique	Zimbabwe	EEC	12,000		
	Malawi	F.R. Germany	10,000		
	Zimbabwe	Australia	9,000		
	Zimbabwe	Austria	5,050		
	Malawi	Norway	1,100		
Sub-Total			37,150	10.9%	9.7%
Tanzania	Malawi	EEC	10,000		
Sub-Total			10,000	14.9%	8.3%
Zambia	Malawi	EEC	20,000		
	Zimbabwe	EEC	15,000		
	Malawi	F.R. Germany	200		
	Zimbabwe	Japan	9,854		
	Zimbabwe	F.R. Germany	660		
Sub-Total			45,714	50.2%	27.9%
TOTAL			102,188		

Notes: Quantity figures refer only to coarse grains, whereas percentage figures in the last two columns refer to all cereals.

* International Committee of the Red Cross.

Source: Alice L. Morton et.al. "Study of Trilateral Food Aid Transactions", Ronco Consulting Corporation, 1987.
FAO, "Food Supply Situation and Crop Prospects in Sub-Saharan Africa: Special Report", October, 1987.

TABLE 7: Zambian Trilateral Food Aid Maize Imports 1983-1986
(Metric Tons)

Import Source	1983	1984	1985	1986
Zimbabwe (Commercial)	1,173	0	49,577	0
Malawi (Commercial)	40,200	29,853	37,666	0
Other (Commercial)	0	0	0	0
Sub-Total (Commercial)	41,373	29,853	87,243	0
Zimbabwe (Trilateral)	84,596	0	18,136	12,386
Malawi (Trilateral)	0	67,417	7,282	2,532
Other Food Aid	0	1,404	2,387	0
Sub-Total (Trilateral)	84,596	67,417	25,418	14,918
Sub-Total (Food Aid)	84,596	68,821	27,805	14,918
TOTAL IMPORTS	125,969	98,674	115,048	14,918
Trilateral as % of Total Maize Imports	67.2%	68.3%	22.1%	100.0%
Trilateral as % of Total Maize Food Aid	100.0%	98.0%	91.4%	100.0%

Source: NAMBOARD

TABLE 8: Zimbabwe Trilateral Maize Exports, Wheat Imports
and Foreign Exchange Gains 1982/83 - 1985/86

	1982/83	1983/84	1984/85	1985/86
Trilateral Maize Exports (MT)	294,757	36,183	28,725	117,581
As Percent of Total Maize Exports	59.9%	14.4%	NA*	41.3%
F.E. Earned (USD millions)	39.833	4.890	0*	15.890
Trilateral Wheat Imports (MT)	31,403	19,224	23,704	7,333
As Percent of Total Wheat Imports	100.0%	35.1%	22.7%	8.5%
F.E. Saved (USD millions)	4.650	2.048	2.506	0.696

Note: Per MT prices are import parity prices c+f Harare and are expressed in real 1980 US dollars deflated by the Zimbabwe CPI.

*Zimbabwe was a net maize importer in this year, so there were no foreign exchange gains.

Source: FAO Commodities and Trade Division for trilateral maize export quantities;
Takavarasha (1987) for trilateral wheat import quantities,
and total maize exports and wheat imports;
Morris (1987) for wheat and maize prices used to calculate
foreign exchange earnings and savings.

production surpluses. Secondly, foreign exchange is either earned (in the case of cash purchases in hard currency by donors) or saved (in the case of swaps where wheat is supplied by donors in exchange for maize).

Table 8 summarizes the foreign exchange benefits derived from trilateral transactions for Zimbabwe from 1982/83-85/86. Although these benefits have been substantial in years like 1982/83 and 1985/86, they have also been highly variable. This variability is probably due to the fact that all of the following factors are involved in determining the extent of trilateral arrangements in any given year: Zimbabwean maize supplies and supplies in alternative source countries such as Malawi and Kenya; maize supplies in potential recipient countries; Zimbabwean supply of and demand for wheat; availability of intra-African transportation facilities; world wheat and maize prices; and willingness to pay in either cash or kind on the part of the international donor community. While trilaterals have grown in importance during the 1980's, potential for further expansion and regularization of trilateral programs may be seriously impeded by inability to control all these variables.

APPENDIX: METHODS USED IN CONSTRUCTING THE CEREALS TRADE DATABASE

A. Data Sources

Much trade data is presented in a format that only lists total imports and exports for individual countries. There are only a few sources where trade figures are reported by source of imports and destination of exports. Table A1 summarizes sources used in constructing the SADCC Cereals Trade Database, commodities and years covered, and the number of times data from each source were used in compiling the database.

1. United Nations Tapes

The United Nations Statistical Office (UNSO) maintains tapes on trade quantities and values by destination and source of exports and imports. Flows are recorded on a calendar year basis. The UN depends on member country reports and makes no effort to revise the data or resolve discrepancies between importer and exporter source quantities.

2. The Economic Research Service

Economists in the Economic Research Service (ERS) of the United States Department of Agriculture (USDA) have attempted to reconcile trade data from various sources using the UN series as a base. They use the following procedure for constructing trade matrices for imports. Each importing country is listed with its corresponding trading partner nations. If only importing country data exists for a particular trading transaction in a given year, it is entered into the matrix. If only exporting country data exists, that number is entered into the matrix. If both importer and exporter source data exist, the importer number is entered and the percent difference between the two figures is noted¹⁶. After this is accomplished, data from additional sources such as country trade yearbooks and international trade organization documents are added (Hiemstra and Mackie, 1986).

3. National Sources

Published national trade yearbooks, computer print outs from central statistical offices, and internal documents of parastatal cereals marketing boards are also important sources of trade data. The authors were able to acquire detailed trade data in Zimbabwe and Zambia for several years. The Central Statistical Office in Zimbabwe maintains an up-to-date computerized database on monthly imports and exports of all commodities. However CSO officials claimed that records are only reliable since Independence. This is due to the sensitivity of trade statistics during the Unilateral Declaration

¹⁶ Data from importers are generally preferred over exporter data because customs officials usually pay closer attention to imports than to exports. This is explained by the relatively greater abundance of duties and quantitative controls on the import side (FAO, 1984b).

TABLE A1: Data Sources for the UZ/MSU SADCC Cereals Trade Database

Data Source	Commodities*	Years Covered	Type of Year	Number of Entries	Percent of Total
UN Tapes	M,W,R	1970-85	Calendar	324	29.4%
ERS Tapes (Reconciled)	M,W,R	1970-85	Calendar	318	28.9%
WFP Documents	W,R	1982-85	July/June	126	11.4%
FAO "Export of Cereals by Dest. and Source"	M,W,R	1981-85	July/June	119	10.8%
ERS Tapes	M,W,R	1970-85	Calendar	87	8.0%
CSO - Zimbabwe	M,W,R	1978-85	Calendar	72	6.5%
NAMBOARD/NMC - Zambia	M,W,R	1980-85	Calendar	31	2.8%
FAO "Food Aid in Figures"	M,W,R	1981, 1984	July/June	15	1.4%
US Ag. Attache Cables	R	1985	Calendar	6	0.5%
Trade Yearbook - Malawi	M,W,R	1981-83	Calendar	3	0.3%
TOTAL				1101	100.0%

* M = Maize
W = Wheat
R = Rice

SOURCE: Authors' Calculations.

of Independence period (UDI) when Rhodesia was subject to an international trade embargo.

Some of the Zambian data were obtained from grain marketing parastatals. The National Agricultural Marketing Board (NAMBOARD) provided import data for maize from 1983-1986. Data on wheat and rice imports were obtained from the National Milling Corporation (NMC). These two parastatals have an official monopoly on trade of these commodities.

Malawi's "Annual Statement of External Trade" is one of the few trade yearbooks which lists sources and destinations by commodity. Some data were also gleaned from this publication.

4. Additional Sources

Beginning in 1981, the FAO has annually published a statistical bulletin entitled "Exports of Cereals by Destination and Source". Quantity flows of wheat and wheat flour, maize, rice, barley, sorghum, oats, and rye are recorded on a July/June basis. All importing countries that report to the FAO are listed whereas only the leading exporting countries are explicitly identified ¹⁷.

Data for food aid transactions were obtained for several years from the FAO publication "Food Aid in Figures". Food aid source and destination quantities are published on a July/June basis for wheat, rice, coarse grains, dairy products, and edible oils.

United States agricultural attaches stationed in embassies around the world also generate annual outlook reports for internal USDA use. These reports often have statistical annexes with detailed trade data. Some of the South African data came from this source.

The World Food Programme also has a great deal of internal documentation on food aid flows and trilateral transactions available upon request. Destination and source of quantities of wheat, rice, coarse grains, and a variety of non-cereal products are included on a July/June basis.

B. STRENGTHS AND LIMITATIONS OF THE DATABASE

1. General Problems With Trade Data

The reasons for discrepancies in importer/exporter trade volume reportings are well-documented (Hiemstra and Mackie, 1986, FAO, 1984b). Among the reasons often cited are:

- a. Non-receipt of reporting documents by the exporting country;

¹⁷ However there is an "others" column which lists aggregated quantities for minor exporters. One of the authors was able to obtain disaggregated source and destination figures from this column during a visit to the FAO in July 1987.

- b. Trading partners may classify and/or aggregate commodities differently;
- c. Trading partners may define imports and exports differently;
- d. Data processing lags which may result in trading partners assigning a transaction to different reporting periods;
- e. Storage, processing, and transshipment may make determination of commodity origin and ultimate destination problematic;
- f. Customs officials may give greater scrutiny to import documentation due to the greater array of regulations associated with imports.

While the above problems are associated with destination and source data, there are also difficulties with alternative sources of aggregated total import/export data. An International Food Policy Research Institute (IFPRI) study compared FAO and Foreign Agricultural Service (FAS) ¹⁸ figures on world imports and exports of individual countries (Paulino and Tseng, 1980). The researchers found that 60 percent of the 1200 pairs of FAO and FAS data on cereals imports in 1965, 1970, and 1975 diverged by more than 20 percent. Reasons given for these discrepancies were:

- a. The FAO reported on a calendar year basis while the FAS reported on a marketing year basis;
- b. The FAO reported data for many small countries that the FAS ignored;
- c. Both organizations modify official national data if they feel such numbers to be unrealistic. Because this is inevitably a rather ad hoc process, total figures diverge between the two agencies.

The largest discrepancies involved data for Africa, Oceania, and the USSR.

2. Trade Data Problems Specific to Southern Africa

Because Southern Africa is such a politically volatile region of the world, detailed information on trade flows is sensitive for some countries. Because of its status as an international pariah, the Republic of South Africa has refused to release trade data for individual African nations since 1977. Only aggregate figures for total trade with Africa are provided. Moreover, trade with Botswana, Lesotho, and Swaziland (BLS), which together with South Africa, comprise the Southern Africa Customs Union (SACU), are considered domestic transactions by South Africa ¹⁹. Therefore, they do not appear in the aggregate trade statistics.

¹⁸ A division of the USDA.

¹⁹ Trade with Namibia is also considered to be a domestic transaction.

There is considerable evidence that commodity flows to other African countries (including the BLS nations and Namibia) are quite large. Table A2 shows aggregated 1979/80 to 1983/84 white and yellow maize export quantities for South Africa. "Unspecified" (which is probably for the most part the SADCC countries and Zaire) is second only to Japan in volume of export sales for both white and yellow maize. Table A3 provides an indication of the magnitude of BLS and Namibian trade volumes for maize and maize products during the 1982/83 to 1985/86 period. Even in years when white maize exports to the rest of the world were insignificant, volumes to the BLS states and Namibia were quite substantial.

To some extent, the failure of South Africa to report trade can be overcome by acquiring data from trading partners. For the most part, SADCC government statistical bureaus do not appear to conceal information on trade with South Africa.

Information on trade was also suppressed during the UDI period when Rhodesia was subject to a series of trade embargoes. As a result, the Zimbabwean CSO has no computer records of trade prior to 1978, and the 1978 and 1979 data are not felt to be reliable by CSO officials²⁰. UN data also give what must be a rather incomplete picture of Rhodesian trade flows in the 1970's.

Apart from political reasons for under-reporting, the administrative capacity to collect and process trade data in a timely and accurate manner is very uneven from one country to another. While the Zimbabwean CSO has an excellent system for compiling up-to-date trade statistics, the Zambian CSO has not published an annual trade yearbook since 1979²¹. In war-torn countries such as Mozambique and Angola, the situation is even worse.

One result of this inconsistency in reporting capability is that UN data loses much of its validity. Even when data is reported in a timely manner, the UN may fail to record it accurately. Either the reporting country has the data and fails to supply them, or the UN somehow fails to tabulate the data quickly and correctly. Table A4 illustrates these problems. Reliable data for Zimbabwe and Zambia are compared with UN reportings for unmilled maize trade in 1984. In the Zimbabwean case, data were supplied by the CSO which is the agency that would presumably report to the UN. In the Zambian case, the data source is NAMBOARD. As discussed above, the Zambian CSO would not have been able to provide this information to the UN.

²⁰ Personal communication from the CSO, July 1987.

²¹ The Zambian CSO is currently working on a trade yearbook for 1985 which is supposed to be released sometime this year. No processed trade information exists for the years 1980-1984 at the CSO.

TABLE A2: South African Unmilled Maize Exports 1979/80 - 1983/84

Destination	Metric Tons		Total	% of Total Maize Exports		
	White	Yellow		White	Yellow	Total
Japan	1,902,000	4,103,000	6,005,000	54.7%	36.3%	40.6%
Taiwan	0	2,283,000	2,283,000	0.0%	20.2%	15.4%
United Kingdom	28,000	663,000	691,000	0.8%	5.9%	4.7%
Hong Kong	0	246,000	246,000	0.0%	2.2%	1.7%
Reunion	0	142,000	142,000	0.0%	1.3%	1.0%
Italy	13,000	117,000	130,000	0.4%	1.0%	0.9%
Spain	0	133,000	133,000	0.0%	1.2%	0.9%
West Germany	8,000	87,000	95,000	0.2%	0.8%	0.6%
Netherlands	0	39,000	39,000	0.0%	0.3%	0.3%
Portugal	22,000	11,000	33,000	0.6%	0.1%	0.2%
Unspecified	1,501,000	3,483,000	4,984,000	43.2%	30.8%	33.7%
TOTAL	1,544,000	4,258,000	5,802,000	26.6%	73.4%	100.0%

Source: Maize Board, "Report on Maize 1984".

TABLE A3: South African Maize and Maize Product Exports to the BLS Countries and Namibia 1982/83 - 1985/86 (Metric Tons)

Year	BLS and Namibia	Rest of World	Total	BLS as % of Total
1982/83				
White Maize	195,000	1,561,000	1,756,000	11.1%
Yellow Maize	27,000	2,804,000	2,831,000	1.0%
Total	222,000	4,365,000	4,587,000	4.8%
1983/84				
White Maize	191,000	196,000	387,000	49.4%
Yellow Maize	57,000	118,000	175,000	32.6%
Total	248,000	314,000	562,000	44.1%
1984/85				
White Maize	253,000	5,000	258,000	98.1%
Yellow Maize	155,000	18,000	173,000	89.6%
Total	408,000	23,000	431,000	94.7%
1985/86				
White Maize	403,000	4,000	407,000	99.0%
Yellow Maize	44,000	539,000	583,000	7.5%
Total	447,000	543,000	990,000	45.2%

Note: "Maize products" are comprised of maize meal grinded to various degrees of fineness, maize flour, and grits.

Source: Maize Board, "Report on Maize 1984" (for 1982/83-83/84 data);

Maize Board, "Report on Maize and Buckwheat 1986" (for 1984/85-85/86 data).

TABLE A4: Unmilled Maize Imports for Zambia and Zimbabwe - 1984
(Metric Tons)

Exporting Country	Zambia:		Zimbabwe:	
	NAMBOARD	UN	CSO	UN
Malawi	97,270	0	50,000	0
USA	0	31,100	43,099	40,943
Argentina	1,404	0	102,943	61,800
Indonesia	0	0	10,038	0
Thailand	0	0	65,861	0
TOTAL				
IMPORTS	98,674	31,100	271,941	102,743

Source: NAMBOARD and UN Trade Tapes for Zambian data;
CSO and UN Tapes for Zimbabwean data.

As can be seen, not only do total imports widely diverge, but the UN data fails to reveal even the existence of trade in five cases reported by the national sources. The result is that the UN database only detects 32 percent of Zambian maize imports and 38 percent of Zimbabwean maize imports for this particular year.

The table also helps to illustrate a further complication which relates to the recording of trilateral food aid transactions²². Such transactions are now very common in Southern Africa. They usually involve a bilateral or multilateral development agency providing either cash or staple food commodities (usually wheat) to a developing country which in turn exports another commodity (most commonly white maize in the Southern African context) to a recipient developing country (Morton et al., 1987). In Table A4, the 31,100 MT figure (a United States export to Zambia according to the UN) was actually a trilateral food aid transaction. The physical source of the commodity was Malawi but because it was financed by the United States, the UN recorded it as a United States export. The UN failed however to report additional Malawian exports to Zambia of 29,850 MT of commercial sales and 35,300 MT of food aid financed by the EC, WFP and the Dutch which are also part of the 97,270 MT figure reported by NAMBOARD. Thus UN figures tend to underestimate the extent of intra-regional movement of maize either because they incorrectly assign the physical source of a commodity when it is a trilateral food aid transaction²³, or because they fail to even detect the existence of trade -- regardless of whether it is a commercial or a food aid transaction.

²² Also referred to as triangular transactions.

²³ This is not a problem for wheat and rice which have not been involved in intra-regional trilateral food aid movements.

Table A5 compares total SADCC import figures of maize, wheat, and rice from two sources -- the FAO trade tapes and the UZ/MSU database. Clearly the authors of this paper were more successful in obtaining destination and source data for more recent years (1981-85) than for the 1970's. This is largely due to the fact that spotty UN data had to be relied upon more heavily for trade in the more distant past. For more recent years, a variety of data sources were available -- leading to a more complete picture of trade patterns. Because 1970's destination and source data are relatively less reliable, the authors used the FAO totals for wheat and rice in constructing the graphs in Section III related to the import bill and total imports, and in calculating average annual growth rates and quantities in Table 1. For maize, the quantity series set forth in Table 5 which includes South African exports to the BLS countries and Namibia were used for the Section III graphs, growth rates, and Table 1 calculations.

Finally there is the problem of unrecorded parallel market cross-border trade. Although there are no reliable estimates of the extent of unofficial trade in cereals, there is much anecdotal evidence of substantial movement of agricultural products and inputs across a number of borders. Zambia's borders with Zaire, Namibia, and Malawi are among those often cited. The "Times of Zambia" recently cited a figure of 300,000 90 kg. bags of maize were being smuggled out of Zambia each month (or 324,000 MT per annum).²⁴

In light of the above discussion of trade data problems, it may seem to the reader that any attempt at an historical reconstruction of trade patterns among the SADCC nations is a fruitless task. This is not entirely true. While time-consuming, first hand collection of the data at national statistical agencies, parastatals, and donor organizations can lead to significant improvements in accuracy and completeness when compared with UN data. It also depends on the use for which the data is intended. While it would be imprudent to employ these data in a quantitative model which relies on great accuracy in the data for the generation of precise results, these data can be useful in describing approximate trade patterns and rough historical trends. They can also be useful for identifying questions for closer examination such as:

- If trade which had been fairly regular between two countries in a commodity abruptly stopped in one year, why may this be so?

- If very small quantities of a commodity are consistently traded between two countries in the face of substantial deficits for one country and significant surpluses for the other, what is constraining the expansion of trade?

- To what extent is the "SADCC market" synonymous with the "Southern African market" for agricultural products? Does it make sense to classify certain SADCC countries as part of the Southern African market when South-South trade links may be stronger with other regions of Africa or the world?

²⁴ "Times of Zambia", March 17, 1988, p.1. There was no explanation of how this figure was derived.

Examples are Tanzania's links with other East African countries and Angola's trade links with South American nations such as Argentina. Alternatively Zaire, which is not a member of SADCC, has historically traded quite heavily in grains with some of the SADCC nations such as Zambia and Zimbabwe.

C. Procedures for Constructing the Database

The authors constructed a database for SADCC imports of maize, wheat, and rice for the years 1970-1985. Both commercial and food aid imports are included. This section first details the rules for selecting one source of data over another in the specification of the import quantities and then briefly describes data entry and trade matrix table formulation procedures.

1. Criteria for Selecting Data Sources

As discussed in section A, principal sources of trade data were the UN, ERS, WFP, FAO, and national documents. Importer data were usually preferred over exporter data in keeping with the FAO's stance that importer data is generally more reliable. Thus if importer data were available, they were entered in the matrices. If only exporter data were available, these numbers were entered. There were two exceptions to this procedure. One exception would be if the exporting country had better reporting capability than the importer. An example would be choosing United States export data over Angolan or Tanzanian import data which had been supplied to the UN. The other exception would be if the exporter data came from a reliable national source whereas the importer data was from the UN (see section a below).

If importer or exporter data were available from several sources, the following decision rules governed selection of one source over another.

a. Data coming directly from national sources were preferred over all other sources regardless of whether they were importer or exporter data. If both importer and exporter data were available from national sources, importer data were selected over exporter data in keeping with the FAO findings. The authors were of the opinion that individual government sources were generally better at tracking information on their own trade than international organizations such as the UN which reports on well over 100 countries around the world and is dependent on national sources for data anyway. The discussion related to Table A4 above confirms that serious gaps exist in the UN data.

b. The ERS was viewed as the second most credible and complete source for the database because attempts at revision of the UN data had been made.

c. The unedited UN data was viewed as the third most reliable source.

d. The FAO publication "Exports of Cereals by Destination and Source" reports data on a July/June basis whereas the UN and most of the national sources report on a calendar year basis. Therefore these data were used only if no other data source existed for either of the two years in question. If chosen, these data were entered in the first of the two years (for example,

TABLE A5: Comparison of FAO and UZ/MSU SADCC Cereals Import Totals 1970-1985
(Metric Tons)

YEAR	Maize		Wheat		Rice		Total Cereals		UZ/MSU Total as % of FAO Total
	FAO	UZ/MSU	FAO	UZ/MSU	FAO	UZ/MSU	FAO	UZ/MSU	
1970	199,026	192,171	421,841	372,946	20,872	9,183	641,739	574,300	89.5%
1971	319,816	320,511	435,600	318,072	22,451	16,313	777,867	654,896	84.2%
1972	226,141	136,237	487,167	387,956	15,842	9,841	729,150	534,034	73.2%
1973	48,374	1,973	437,973	195,245	15,859	153,052	502,206	350,270	69.7%
1974	289,045	305,492	490,909	221,949	81,190	33,921	861,144	561,362	65.2%
1975	389,692	270,232	628,385	278,033	83,383	48,301	1,101,460	596,566	54.2%
1976	120,595	80,616	420,571	282,406	71,793	22,064	612,959	385,086	62.8%
1977	100,586	96,869	469,550	301,617	143,975	35,808	714,111	434,294	60.8%
1978	236,225	133,052	448,199	211,627	147,848	56,108	832,272	400,787	48.2%
1979	387,970	211,755	590,534	276,788	162,828	32,956	1,141,332	521,499	45.7%
1980	1,068,856	652,016	703,089	314,390	226,454	54,943	1,998,399	1,021,349	51.1%
1981	572,117	588,942	636,703	539,353	150,877	120,040	1,359,697	1,248,335	91.8%
1982	469,116	493,376	613,940	481,731	259,412	272,850	1,342,468	1,247,957	93.0%
1983	506,200	457,426	568,700	518,244	254,340	233,542	1,329,240	1,209,212	91.0%
1984	1,118,900	935,150	805,200	904,208	249,000	443,422	2,173,100	2,282,780	105.0%
1985	653,600	825,291	727,500	509,669	251,070	329,030	1,632,170	1,663,990	101.9%

Source: FAO Trade Tapes and UZ/MSU SADCC Cereals Trade Database.

Examples are Tanzania's links with other East African countries and Angola's trade links with South American nations such as Argentina. Alternatively Zaire, which is not a member of SADCC, has historically traded quite heavily in grains with some of the SADCC nations such as Zambia and Zimbabwe.

C. Procedures for Constructing the Database

The authors constructed a database for SADCC imports of maize, wheat, and rice for the years 1970-1985. Both commercial and food aid imports are included. This section first details the rules for selecting one source of data over another in the specification of the import quantities and then briefly describes data entry and trade matrix table formulation procedures.

1. Criteria for Selecting Data Sources

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b. The ERS was viewed as the second most credible and complete source for the database because attempts at revision of the UN data had been made.

c. The unedited UN data was viewed as the third most reliable source.

d. The FAO publication "Exports of Cereals by Destination and Source" reports data on a July/June basis whereas the UN and most of the national sources report on a calendar year basis. Therefore these data were used only if no other data source existed for either of the two years in question. If chosen, these data were entered in the first of the two years (for example,

1985/86 data were entered for 1985). Admittedly, this is rather arbitrary, but better than deleting the trade flow altogether.

e. FAO "Food Aid in Figures" data and WFP internal documentation are also reported on a July/June basis. These sources only superseded a UN number if the food aid quantity reported was greater than the UN figure for the same transaction. If not, it was ignored. Other than this, the same rules were followed as for data from the "Exports of Cereals by Destination and Source" series.

2. Data Entry Procedures

Raw data were entered onto a Lotus 123 spreadsheet and then loaded for processing into the microcomputer version of the Statistical Package for the Social Sciences (SPSSPC). Tables A6 and A7 are examples of the two types of tables generated. Table A6 shows Southern African imports of a single commodity for a single year. Southern African nations (SADCC and South Africa) which imported in that year are listed along the horizontal axis while exporting nations are listed down the vertical axis. Tables were done for each commodity in each year (1970-1985). Quantities traded are identified in the body of the table. In Table A7, an historical series of imports is generated for a single country. Tables were formulated for each commodity and for each of the nine SADCC countries and South Africa ²⁵.

²⁵ Complete sets of tables are available upon request.

TABLE A6: SOUTHERN AFRICA WHEAT IMPORTS (IN THOUSAND METRIC TONS)

YEAR
1978

	IMPORTING COUNTRY						
	ANGOLA	LESOTHO	MALAWI	MOZAMBIQUE	TANZANIA	ZAMBIA	SOUTH AFRICA
EXPORTING COUNTRY							
USA	27.532	1.700	.	.	14.995	29.200	.398
BELGIUM/LUXEMBURG	.	.	.	1.400	.	.	.
CANADA	.	.	.	11.000	.	.	.200
EEC	.	.	1.400	.	.	.	.
FRANCE	.	.	.	39.000	.	.	1.500
ITALY	.	.	.	3.000	.	.	.
AUSTRALIA	.	.	.	11.000	.	71.400	.
TOTAL IMPORTS	27.532	1.700	1.400	65.400	14.995	100.600	2.098

Source: UZ/MSU SADCC Cereals Trade Database.

TABLE A7: SOUTHERN AFRICA MAIZE IMPORTS (IN THOUSAND METRIC TONS)

IMPORTING COUNTRY
TANZANIA

	EXPORTING COUNTRY								
	MALAWI	ZAMBIA	ZIMBABWE	USA	ARGENTINA	CANADA	EEC	KENYA	THAILAND
YEAR									TOTAL IMPORTS
1970	.	.	.	14.345	.	.	.	.	14.345
1971	.	.	.	58.232	.	.	.	.	58.232
1972	12.733	.	.	58.580	.	.	.	.	71.313
1974	19.660	69.133	.	.	.	.	.	.	88.793
1975	15.962	.	.	175.552	.	.	.	.	191.514
1977	.	.031	.	37.260	.	.	.	3.630	40.921
1979	.	.	.	.	.	.	.	4.300	4.300
1980	.	.	.	204.936	.	.	.	2.670	207.606
1981	.	.	9.689	129.691	.	85.100	.	.	224.480
1982	.	.	61.459	29.346	.	.	10.000	.	100.805
1983	21.000	.	24.983	.	.	.	4.000	8.824	58.807
1984	12.900	.	10.000	.	157.300
1985	.	.	.075	55.000

Source: UZ/MSU SADCC Cereals Trade Database.

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